REMARKS

Claims 1-10 are all the claims pending in the application. By this Amendment, Applicant amends claim 2 to cure a minor informality and adds claims 11-18, which are clearly supported throughout the specification.

I. Preliminary Matters

As preliminary matters, Applicant thanks the Examiner for initialing the references listed on Form PTO/SB/08 A & B (modified) submitted with the Information Disclosure Statement filed on December 28, 2004. Applicant further thanks the Examiner for accepting the drawings filed December 28, 2004.

II. Summary of the Office Action

The Examiner objected to the specification. The Examiner also rejected claims 1 and 6-8 under 35 U.S.C. § 102(e) and claims 9 and 10 under 35 U.S.C. § 103(a). Claims 2-5 contain allowable subject matter.

III. Objection to the Specification

The Examiner objected to the Abstract of Disclosure for being over 150 words. Applicant herein shortens the Abstract. In view of this amendment to the specification, Applicant respectfully requests the Examiner to now withdraw this objection.

IV. Claim Rejection under 35 U.S.C. § 102

Claims 1 and 6-8 are rejected under 35 U.S.C. § 102(e) as being anticipated by Chuah et al. (US 6,377,548 B1), hereinafter referred to as "Chuah". Applicant respectfully traverses these grounds of rejection at least in view of the following exemplary comments.

Claim 1

Of these rejected claims, only claim 1 is independent. Independent claim 1 *inter alia* and in some variation recites: "a communication state determination unit which obtains a transmission cycle period and the total number of wireless stations in use each contained in a header of the received communication packet; and a transmission timing controller which selectively determines an arbitrary one of the communication slots in a next transmission cycle period when the communication packet is not received during the entire span of the one transmission cycle period, or selectively determines the one of the communication slots to be used by estimating a vacant one of the communication slots in the next transmission cycle period from the transmission cycle period and the total number of wireless stations in use each obtained by the communication state determination unit when the communication packet is received."

In an exemplary, non-limiting embodiment, slots are not fixed to a particular station in TDMA system. The slots are used freely, increasing efficiency. For example, a controller determines a vacant slot to use in the next cycle from the current cycle. Specifically, the controller checks if packets are received in the context of a current cycle. If no packets are received, any slot can be used in the next cycle and the controller arbitrarily selects a slot in the next transmission cycle for transmitting information. On the other hand, if data is received in the current transmission cycle, the controller examines the header of the packet. That is, the controller obtains the transmission cycle period (as cycle periods may vary in length) and the number of stations in use from the header of the received packet. Based on this information, the controller selects a particular vacant slot for use in the next cycle.

It will be appreciated that the foregoing remarks relate to the invention in a general sense, the remarks are not necessarily limitative of any claims and are intended only to help the Examiner better understand the distinguishing aspects of the claim mentioned above.

The Examiner contends that claim 1 is directed to a modem device and is anticipated by Chuah. Specifically, the Examiner alleges that Chuah's disclosure of dynamically assigning minislots somehow anticipates the controller set forth in claim 1. The Examiner further alleges that MAC header of Chuah discloses the determination unit set forth in claim 1 (*see* page 3 of the Office Action). Applicant respectfully disagrees.

Chuah

Chuah discloses various frame formats for a medium access control (MAC) scheme for an Internet access system including extensions for frequency division half-duplex (FDHD) mode and frequency division full-duplex (FDFD) mode. In both FDHD and FDFD modes, the access point (AP) transmits to the remote hosts at a downlink frequency f1 while the remote nodes transmit to the AP at an uplink frequency f2. The length of downlink and uplink transmission times need not be the same. For example, if traffic characterization indicates that a 4:1 ratio of downlink to uplink transmission time (downlink transmission being longer than uplink transmission) is optimal, then optimal performance will generally be seen with the allocation of a downlink frame size of 4x ms and an uplink frame size of x ms (Figs. 3 and 4; col. 10, line 53 to col. 11, line 10).

In Chuah, the downlink frame for the FDHD scheme may include physical layer overhead, such as some combination of guard and/or preamble bits 310 (which may be used as synchronizing bits), a medium access control (MAC) header 312, various control messages such as certain types of beacon messages 314, transmit permits 320, minislot information for the next

uplink frame 350, and transmit schedules 322, acknowledgments (ACKs) for the reservation of minislots in previous uplink frame 330, acknowledgments for the data sent in the previous uplink frame 340, broadcast/multicast data messages 360, unicast data messages 380, and a frame check sequence (FCS) 355 for each preceding data message. The data slots 380 include transmissions from multiple remote nodes. One of the frame control bits is a "more" bit that is used to indicate that the remote node has more data to transmit. Alternatively, the number of remaining bytes or number of fixed size packets left to be transmitted may be particularly specified, rather than just through use of a "more" bit (Fig. 3; col. 11, lines 11 to 61).

With respect to the FDHD uplink frame, Chuah discloses that it will consist of a contention period 410 and a contention-free period 415. The contention period 410 includes one or more contention slots, each of which can be either a contention data slot 420 or a contention reservation slot 422. The contention-free period 415 consists of acknowledgments 440 for previous downlink dataslots and multiple data slots 480 and 486. If desirable, these contention slots 420 and 422 may be spread uniformly across the whole frame rather than clustered together. Each contention reservation slot 422 may be further subdivided into k subslots 430, called reservation minislots. Each minislot 430 is long enough to contain the identity of a remote node, generally around 30 bytes. Contention slots 420 may be utilized as dataslots for transmitting small data packets. The contention-free period 415 may include pure ACK frames 440, pure data frames 480, and/or combination frames 486 having both data 488 and ACK 490 portions. The number of minislots 430 may be dynamically changed. If, for example, there are k minislots in a contention reservation slot 422 and N total contention slots, N1 of which are reservation slots 422 containing a total of N1*k minislots, then the remaining (N-N1) slots are currently contention data slots. If there are a minimum and maximum number of reservation minislots

desired for the system, the number of available reservation minislots can be dynamically changed based on the percentage of idle minislots and the total uplink queue length (Fig. 4; col. 11, line 63 to col. 12, line 25).

Chuah, however, simply discloses that the number of available minislots in each contention reservation slot may be dynamically changed. Chuah does not disclose a selection of a particular minislot in the next contention slot. In other words, Chuah does not disclose or suggest selecting for transmission a random slot in the next cycle when no packets are received in the previous transmission cycle. Furthermore, Chuah does not disclose or suggest that when a packet is received in a transmission cycle, determining a particular slot in the next transmission cycle by estimating vacant slot and total number of stations in the system.

With respect to assignments, Chuah only discloses that different nodes have different priorities and that minislots are divided into various groups. For example, a group of remote nodes with MAC addresses within a certain range may only be allowed to randomly access up to M_2 minislots (where $M_2 < M_1$), whereas a higher priority group of remote nodes with MAC addresses within another range may be allowed to randomly access up to M_1 minislots. Alternatively, priority classes may be assigned to nodes based on connection identity rather than MAC address (col. 12, lines 26 to 44).

In other words, in Chuah, a particular group is assigned a particular number of slots. In Chuah, however, there is no disclosure or suggestion as to *how* a particular minislot for a particular node is selected. Furthermore, Chuah does not disclose or suggest varying the selection based on *various conditions*. Specifically, Chuah does not disclose or suggest selecting a random minislot in the next cycle when no packets are received in the current cycle and determining/selecting a particular minislot in the next cycle when a packet is received in the

current cycle, where this determination/selection is based on estimating a vacant slot and total number of nodes in the system. For example, in Chuah, there is no disclosure or suggestion of the node determining to select a second minislot because it is the second node in the system and because the first node transmitted data in the first minislot.

Furthermore, in Chuah, the MAC header may include at least frame control bits, source and destination MAC addresses, and frame duration. For example, the MAC header includes a one-byte frame control (FC) field 602, a 2-byte frame duration field 630, a 6-byte source MAC address 632, a 6-byte destination MAC address 634, and a 2-byte sequence control field 636 further subdivided into a 12-bit sequence number and a 4-bit fragment number (Figs. 6A and 6B; col. 13, line 37 to col. 14, line 11). There is no disclosure or suggestion, however, that the MAC header of Chuah includes a number of stations being used.

For at least these exemplary reasons, claim 1 is patentably distinguishable from (and is patentable over) Chuah. Accordingly, Applicant respectfully requests the Examiner to withdraw this rejection of claim 1. Claims 6-8 are patentable at least by virtue of their dependency.

V. Claim Rejection under 35 U.S.C. § 103

Claims 9 and 10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Chuah, in view of Gummalla et al. (US 2002/0021711 A1), hereinafter referred to as "Gummalla". Applicant respectfully traverses these grounds of rejection at least in view of the following exemplary comments.

Claims 9 and 10 depend on claim 1. Applicant has already demonstrated that Chuah does not meet all the requirements of independent claim 1. Gummalla is cited for its disclosure of a continuous transmission of information and as such fails to cure the deficient disclosure of Chuah. Together, the combined teachings of these references would not have (and could not

have) led the artisan of ordinary skill to have achieved the subject matter of claim 1. Since claims 9 and 10 depend on claim 1, they are patentable at least by virtue of their dependency.

VI. Allowable Subject Matter

Claims 2-5 contain allowable subject matter. Applicant respectfully holds the rewriting of these claims into their respective independent forms in abeyance until arguments presented with respect to claim 1 have been reconsidered.

VII. New Claims

In order to provide more varied protection, Applicant adds claims 11-18.

Claims 11-15 are patentable at least by virtue of their dependency on claim 1.

Claims 16 is patentable at least by virtue of reciting "determining by the wireless node whether the communication packet is received in a current transmission cycle period; if the communication packet is not received during entire span of the current transmission cycle period, selecting an arbitrary communication slot for the wireless node to transmit data in next transmission cycle period; and if the communication packet is received in the current transmission cycle period, determining a vacant communication slot for the wireless node to transmit data in the next transmission cycle period, wherein the vacant communication slot is determined based on the obtained transmission cycle period and the total number of wireless stations being." Claims 17 and 18 are patentable at least by virtue of their dependency on claim 16.

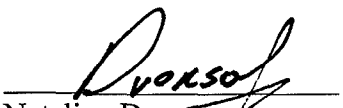
VIII. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the

Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly invited to contact the undersigned attorney at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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